

## ABSTRACT

Multivalent ligands carry at least one recognition element (RE) for binding directly or indirectly to biological particles or molecules. Multivalent ligands most generally function for binding or targeting to any biological particle or molecule and particularly for targeting of cells or viruses, for cell aggregation and for macromolecular assembly of biological macromolecules. The multivalent ligands are scaffolds of chemical or biological species, including, antigens, epitopes, ligand binding groups, ligands for cell receptors, and various macromolecules. Multivalent ligands can carry at least one signal recognition element (SRE) and modulate biological responses in biological systems. Multivalent ligands can carry at least one binding recognition element (BRE), optionally in combination with one or more SRE, and modulate biological responses in biological systems. The invention also relates to methods for aggregating biological particles and macromolecules and for modulating biological response employing multivalent ligands.